UNITED STATES PATENT AND TRADEMARK OFFICE

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10/576,136	04/17/2006	Frank Leonard Kooi	TNO-12(P66728US00)	5490

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2009*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-24* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-17 and 19-23* is/are rejected.

7)☒ Claim(s) *18 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 April 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   The amendment filed on 30 April 2009 has been entered and considered by the

examiner.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 13, 16-17, 19 and 22-23 are rejected under 35 U.S.C. 103(a) as being

anticipated by *Sullivan* (US 2002/0113753).

As to **claim 13**, *Sullivan* (Fig. 2) discloses a multi-layer display for

displaying overlapping images (multi-planar volumetric display with overlapping

images to appearing as one continuous image [abstract, 0056-0057]), the display

comprising:

a light source (image projector 63 [0065]; Fig. 2);

a first translucent image screen (36), placed substantially perpendicular to

a viewing axis from the light source (first image screen 36 is perpendicular to the

light from image projector 63 or orthogonal to the z-axis extending from projector

63 to viewpoint 65), for displaying a first image having at least one of a color,

grey tone and a pattern (displays an image slice 44 [0066] in grayscale [0086] or

color [0062, 0070, 0087] and having a pattern), and displaying the first image in

one of a transparent state, a normal appearance state and an occluded state

(each image plane can display in a transparent state [0042, 0057], a normal

appearance state in which liquid crystal elements are opaque to display an image

[0057], and an occluded state in which an image in the foreground blocks part of

an image in the background such as image slice 50 on screen 42 blocks from the

user part of the images on screens between it an image projector 63; Fig. 2.

Further, other methods of occlusion are taught that are freely applied [0090]), the

viewing axis extending from the light source through the first image screen to a

viewpoint (viewing axis extends from image projector 63 through the image

screens displaying full image 34 at viewpoint of user 65; Fig. 2); and

a second translucent image screen placed substantially perpendicular to

the viewing axis and located between the first image screen and the viewpoint

(image screen 40 placed perpendicular to the image projector 63 and between

first image screen 36 and the viewpoint 65 of user), with the viewing axis

extending through the second image screen (viewing or z-axis extends from

image projector 63 through each optical image screen 36, 38, 40, and 42 to

viewpoint 65) and spatially separated from the first image screen (each screen is

spatially separated from the other in order to create the 3D effect [0072-0073]),

and oriented substantially parallel to and overlapping with the first image screen

(second image screen 40 is parallel to and overlaps first image screen 36), the

second image screen for displaying a second image, having at least one of a

color, grey tone and a pattern (displays an image slice 48 [0066] in grayscale

[0086] or color [0062, 0070, 0087] and having a pattern), and displaying the

second image in one of the transparent state, the normal appearance state and

the occluded state (each image plane can display in a transparent state [0042,

0057], a normal appearance state in which liquid crystal elements are opaque to

display an image [0057], and an occluded state in which an image in the

foreground blocks part of an image in the background such as image slice 48 on

screen 40 blocks from the user part of the images on screens between it and

image projector 63; Fig. 2. Further, other methods of occlusion are taught that

are freely applied [0090]); and

wherein the first image screen is controlled to alternate at least part of the

first image between a transparent state and the normal appearance state (each

image screen alternates individual liquid crystal pixel elements between a

transparent state and an opaque or image displaying state [0057] and as shown

in Fig. 2 first image screen 36 displays image slice 44 on pixel elements set in an

image displaying state while the surrounding elements are transparent [0057])

and the second image screen is controlled to alternate synchronously with the

first image screen, at least a part of the second image between the occluded

state and the normal appearance state (all image screens are synchronized with

image projector 63 [0056] and can further be synchronized to alternate together

[0066], individually [0075, 0079] and or two at a time with odd screens such as

36 and 40 driven together [0080]), and the normal appearance state of the first

image occurs simultaneously with the occluded state of the second image (liquid

crystal elements of image slice 44 on the first image screen are opaque to

display an image [0057] while the liquid crystals of image slice 48 on the second

image screen are opaque blocking parts of image slices on screens behind it

thus providing the user one continuous image [0057]; Fig. 2. Further occlusions

are done on an element by element basis as taught by [0090]) and the

transparent state of the first image occurs simultaneously with the normal

appearance state of the second image (liquid crystal elements around the image

slice 44 of the first image screen 36 are transparent [0057] while some liquid

crystal elements of the second screen 42 are opaque to display image slice 50

[0057]) so as to produce and image for viewing at the viewpoint (produces

complete image 34 for viewing at viewpoint 65 [0066]).

As to **claim 19**, *Sullivan* (Fig. 2) discloses a method for displaying colored

images on a multi-layer display (multi-planar volumetric display with overlapping

images to appearing as one continuous image [abstract, 0056-0057]), the multi-

layer display having

a first translucent image screen(36), placed substantially perpendicular to

a viewing axis from the light source (first image screen 36 is perpendicular to the

light from image projector 63 or orthogonal to the z-axis extending from projector

63 to viewpoint 65), for displaying a first image having at least one of a color,

grey tone and a pattern (displays an image slice 44 [0066] in grayscale [0086] or

color [0062, 0070, 0087] and having a pattern), and displaying the first image in

one of a transparent state, a normal appearance state and an occluded state

(each image plane can display in a transparent state [0042, 0057], a normal

appearance state in which liquid crystal elements are opaque to display an image

[0057], and an occluded state in which an image in the foreground blocks part of

an image in the background such as image slice 50 on screen 42 blocks from the

user part of the images on screens between it an image projector 63; Fig. 2.

Further, other methods of occlusion are taught that are freely applied [0090]), the

viewing axis extending from the light source through the first image screen to a

viewpoint (viewing axis extends from image projector 63 through the image

screens displaying full image 34 at viewpoint of user 65; Fig. 2); and

a second translucent image screen placed substantially perpendicular to

the viewing axis and located between the first image screen and the viewpoint

(image screen 40 placed perpendicular to the image projector 63 and between

first image screen 36 and the viewpoint 65 of user), with the viewing axis

extending through the second image screen (viewing or z-axis extends from

image projector 63 through each optical image screen 36, 38, 40, and 42 to

viewpoint 65) and spatially separated from the first image screen (each screen is

spatially separated from the other in order to create the 3D effect [0072-0073]),

and oriented substantially parallel to and overlapping with the first image screen

(second image screen 40 is parallel to and overlaps first image screen 36), the

second image screen for displaying a second image, having at least one of a

color, grey tone and a pattern (displays an image slice 48 [0066] in grayscale

[0086] or color [0062, 0070, 0087] and having a pattern), and displaying the

second image in one of a transparent state, the normal appearance state and the

occluded state (each image plane can display in a transparent state [0042,

0057], a normal appearance state in which liquid crystal elements are opaque to

display an image [0057], and an occluded state in which an image in the

foreground blocks part of an image in the background such as image slice 48 on

screen 40 blocks from the user part of the images on screens between it and

image projector 63; Fig. 2. Further, other methods of occlusion are taught that

are freely applied [0090]);

wherein the method comprises the steps of:

alternating at least part of the first image between the transparent

state and the normal appearance state (each image screen alternates

individual liquid crystal pixel elements between a transparent state and an

opaque or image displaying state [0057] and as shown in Fig. 2 first image

screen 36 displays image slice 44 on pixel elements set in an image

displaying state while the surrounding elements are transparent [0057]);

and

alternating, synchronously with the first image screen, at least part

of the second image between the occluded state and the normal

appearance state (all image screens are synchronized with image

projector 63 [0056] and can further be synchronized to alternate together

[0066], individually [0075, 0079] and or two at a time with odd screens

such as 36 and 40 driven together [0080]) and wherein the normal

appearance state of the first image occurs simultaneously with the

occluded state of the second image (liquid crystal elements of image slice

44 on the first image screen are opaque to display an image [0057] while

the liquid crystals of image slice 48 on the second image screen are

opaque blocking parts of image slices on screens behind it thus providing

the user one continuous image [0057]; Fig. 2. Further occlusions are done

on an element by element basis as taught by [0090]) and the transparent

state of the first image occurs simultaneously with the normal appearance

state of the second image (liquid crystal elements around the image slice

44 of the first image screen 36 are transparent [0057] while some liquid

crystal elements of the second screen 42 are opaque to display image

slice 50 [0057]) so as to produce and image for viewing at the viewpoint

(produces complete image 34 for viewing at viewpoint 65 [0066]).

As to **claims 16 and 22**, *Sullivan* discloses wherein the first and second

image screens are arranged to alternate, synchronously with the first image

screen (all image screens are synchronized with image projector 63 [0056] and

can further be synchronized to alternate together [0066], individually [0075, 0079]

and or two at a time with odd screens such as 36 and 40 driven together [0080]),

only an overlapping part of the first and second images, as viewed from the

viewpoint (due to the fact that the image generated by this display is a

continuous 3D volumetric image with a continuous field of view in front of the

farthest plane from the projector 63 while maintaining its 3D volumetric display

[0056-0057, 0061-0062], every point on the second screen is viewed as

overlapping every point on the first image screen as viewed from the user 65.

Therefore, with the first 36 and second 40 image screens alternating to display

image slices 44 and 48, respectively, only that part which is overlapping as

viewed from the viewpoint of the user is being alternated; i.e. every point of slice

48 overlaps a point of slice 44).

As to **claims 17 and 23**, *Sullivan* (Fig. 2) discloses an intermediate image

screen (image screen 38), placed between the first and the second image

screens (located between first image screen 36 and second image screen 40),

wherein the intermediate image screen is controlled to display a third image

which partially overlaps with the first image on the first image screen (image slice

46 on the intermediate image screen 38 overlaps image slice 44 on the first

image screen 36 as seen from viewpoint 65) and which is partially overlapped by

the image on the second image screen (image slice 48 on second image screen

40 overlaps image slice 46 on intermediate image screen as seen from viewpoint

65).

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 14-15 and 20-21 rejected under 35 U.S.C. 103(a) as being unpatentable

over *Sullivan* (US 2002/0113753) in view of *Tegreene* (US 6,445,362).

        As to **claims 14 and 20**, *Sullivan* (Fig. 2) discloses wherein the first image

screen is controlled to occlude, while displaying the first image in the normal

appearance state, at least a part of a display on the first image screen (in the

normal appearance state the liquid crystal elements of image slice 44 on first

image screen 36 are set opaque so as to scatter light and produce an image

thereon. Therefore, those elements are intentionally set to occlude/block light

from projector 63 [0057]. Further, it is expressed that the entire screen can be set

opaque thus occluding/blocking the background light from projector 63 as well

[0077]).

        Sullivan does not expressly disclose wherein the occluded portion does

not form part of the image in the normal appearance state. However, it is

expressed that occlusion on each image screen is done on a pixel by pixel basis

and therefore can be done on the same image screen as one in a normal

appearance state displaying an image [0057, 0090].

        Tegreene discloses wherein an occluded portion does not form part of the

image in a normal appearance state (the background surrounding the tree in Fig.

2B is occluded to prevent the display of images on the screen behind it [col. 1,

lines 61-62]).

        At the time of invention, it would have been obvious for a person of

ordinary skill in the art to have occluded part of the screen not forming the image

as taught by *Tegreene* in the display of *Sullivan*. The suggestion/motivation would have been to block an undesirable portion of a background image [col. 1, lines 61-62].

As to **claims 15 and 21**, *Sullivan* (Fig. 2) discloses wherein the second image screen is controlled to occlude, while displaying the second image in the normal appearance state, at least part of a display on the second image screen (in the normal appearance state the liquid crystal elements of image slice 48 on second image screen 40 are set opaque so as to scatter light and produce an image thereon. Therefore, those elements are intentionally set to occlude/block light from projector 63 as well as block images of screens directly behind them [0057]. Further, it is expressed that the entire screen can be set opaque thus occluding/blocking the background light from projector 63 as well [0077]).

Sullivan does not expressly disclose wherein the occluded portion does not form part of the image in the normal appearance state. However, it is expressed that occlusion on each image screen is done on a pixel by pixel basis and therefore can be done on the same image screen as one in a normal appearance state displaying an image [0057, 0090].

Tegreene discloses wherein an occluded portion does not form part of the image in a normal appearance state (the background surrounding the tree in Fig. 2B is occluded to prevent the display of images on the screen behind it [col. 1, lines 61-62]).

Allowable Subject Matter

6.　　Claims 18 and 24 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

7.　　Applicant's arguments with respect to claims 13-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8.　　The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

>　　a. *Sullivan* (US 2002/0113753) teach and/or suggest each of the combinations of normal, occluded, and transparent states as claimed in dependent claims 18 and 24. However, *Sullivan* fails to teach the detailed driving scheme of the combination display states within the specified period. Specifically, *Sullivan* fails to teach "wherein the first, second and third image states are successively displayed in a synchronized but alternating fashion so as to produce the image for viewing at the viewpoint" wherein the claimed first, second and third image states are claimed as the specific combinations of normal, occluded, and transparent states of each image screen.

    b. *Bass* (US 5,956,180) teaches an optical viewing system with synchronously overlaid images with normal, transparent, and occluded image states wherein foreground images are made to occlude background images.

    c. *Sullivan* (US 6,377,229 and 2002/0113752) teach multi-planar volumetric displays similar to the cited Sullivan reference cited in the rejection above.

    d. *Suyama* (US 6,525,699) teaches a three-dimensional multi-planar system with multiple image screens having transparent, normal, and occluded states in which only the part of the images on the screens that is overlapping changes similar to what is claimed in claims 16 and 22.

9.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

    A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert M. Stone whose telephone number is (571)270-5310. The examiner can normally be reached on Monday-Friday 9 A.M. - 4:30 P.M. E.S.T. (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chanh D. Nguyen can be reached on (571)272-7772. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert M Stone/   /Chanh Nguyen/
Examiner, Art Unit 2629   Supervisory Patent Examiner, Art
                                                      Unit 2629